



Grading, P., Strohmeier, D., & Spiel, Ch. (2010). Definition and Measurement of Cyberbullying. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 4(2), article 1.
<http://cyberpsychology.eu/view.php?cisloclanku=2010112301&article=1>

Definition and Measurement of Cyberbullying

Petra Grading¹, Dagmar Strohmeier², Christiane Spiel³

^{1,2,3} University of Vienna, Austria

Abstract

The main goal of the present study was to improve the conceptual understanding of cyberbullying by empirically comparing the number of identified bullies and cyberbullies based on two measurement methods (global vs. specific items) and two cut off scores (lenient vs. strict). 1150 students (48% girls) aged 10 to 15 ($M = 12.39$, $SD = 1.16$) years were examined via self assessments. The number of cyberbullies was systematically underestimated when using a global item compared with three specific items indicating that the global cyberbullying item did not fully cover the behaviors described by the three specific cyberbullying items. Only 73 students (6.3%) were identified as occasional cyberbullies and 18 (1.6%) as frequent cyberbullies using the global item, while 186 students (16.2%) were identified as occasional cyberbullies and 87 (7.6%) as frequent cyberbullies using the specific items assessment. Controlling for traditional bullying, only 12 students (1%) remained pure occasional cyberbullies and only six students (0.5%) remained pure frequent cyberbullies when using the global item. According to the specific items assessment, 59 students (5.1%) remained pure occasional cyberbullies and 56 (4.9%) remained pure frequent cyberbullies. Thus, a distinct cyberbully group could only be identified when using a specific items assessment. Irrespective of measurement method and cut off scores, combined bullies (students being both cyberbullies and bullies) showed higher levels in overt and relational aggression compared with bullies and non bullies. Girls expressed higher levels of overt aggression than boys when they were identified as frequent combined bullies.

Keywords: cyberbullying, bullying, measurement, overt aggression, relational aggression

Introduction

Cyberbullying is often defined as bullying using electronic forms of contact (Smith, Mahdavi, Carvalho, Fisher, Russell, & Tippett, 2008; Slonje & Smith, 2008). Qualitative research showed that students aged 10 to 18 define cyberbullying as bullying through modern technological devices which (1) is intended to hurt, (2) is part of a repetitive pattern of negative actions and (3) is performed in a relationship characterized by a power imbalance (Vandebosch & van Cleemput, 2008). To improve the conceptual understanding of cyberbullying, a theoretical discussion has already been started within the scientific community (e.g., Dooley, Pyzalski, & Cross, 2009; Menesini & Nocentini, 2009). Because the definition and measurement of cyberbullying are intertwined issues (Menesini & Nocentini, 2009), the present paper aims to add to the understanding of cyberbullying by empirically comparing two different measurement methods and two different cut off scores for the identification of bullies and cyberbullies. We simultaneously look at bullies and cyberbullies, because cyberbullying and bullying are conceptually and empirically overlapping phenomena (see definitions above; Grading, Strohmeier, & Spiel, 2009, in press).

Definition of bullying and cyberbullying and measurement methods

The most often used method to identify traditional bullies or cyberbullies is via self assessments (e.g., Solberg & Olweus, 2003; Välimäki, 2010). Self assessments are able to offer information on subjective experiences which are privately felt and which need not necessarily be verified by other informants (Graham, Bellmore, & Juvonen, 2003). Within self assessments two approaches can be distinguished: global item vs. specific items assessment. While the global item measurement directly asks about the involvement in bullying during a certain period of time (e.g., during the past couple of months), the specific items measurement asks for the involvement in several concrete behaviours (e.g., hitting, teasing, etc.) considered major components of the bullying construct. A research based definition of bullying often precedes both the global and the specific behavior based items (e.g., Olweus, 1991; Roland, 1989; Smith & Sharp, 1994; Kaernae et al., in press). Conceptually, the global item measurement assumes that respondents fully understand the broad concept of bullying including hostile intent, repetition, power imbalance and its various forms when answering. Research however showed that this might not be the case for children of all age groups (Vaillancourt et al., 2008; Monks & Smith, 2006) and cultures (Smith, Cowie, Olafsson, & Liefoghe, 2002; Strohmeier & Toda, 2008). For instance, eight year old children consider fewer negative behaviour options to be bullying compared with 14 year old adolescents (Smith et al., 2002). Furthermore, the term "bullying" does not even exist in all languages (Strohmeier & Toda, 2008). Consequently, results of global item measurements are also dependent on the concrete terms used in the concrete language (e.g., Smith et al., 2002). Smith et al. (2002) showed that terms used in different countries remarkably differed regarding their meanings; some terms rather captured verbal aggression, while others are rather connotated with physical aggressive acts or social exclusion. Also, the specific item measurement has limitations. For instance, the specific behaviours reported are not necessarily bullying. In addition, the identification of

bullies and victims based on multiple items can be done in different ways resulting in prevalence rates which are difficult to compare (Solberg & Olweus, 2003). Surprisingly, frequencies based on global item assessments were only rarely directly compared with frequencies obtained from specific behavior based items (e.g., Salin, 2001) although in many studies both global items and specific items have been collected (e.g. Smith et al., 2008; Kowalski & Limber, 2007). Conceptually, for both bullying and cyberbullying the global item comprises the behaviours captured with the specific items. Therefore, when comparing frequencies based on a global item with frequencies based on a number of specific items it is possible to determine whether the global item empirically covers the behaviors described in the specific items. Such a comparison is informative for cyberbullying, because all the challenges associated with measuring bullying also apply to the measurement of bullying through modern technological devices.

Definition of bullying and cyberbullying and cut off scores

The choice of appropriate cut off scores is conceptually intertwined with the criterion of repetition proposed in virtually all bullying (Olweus, 1991; Roland, 1989; Smith & Sharp, 1994) and most cyberbullying definitions (Smith et al., 2008; Vandebosch & van Cleemput, 2008). Self assessments cover the criterion of repetition in two ways: Firstly, the repetitive nature of bullying is often explained to the students via a definition preceding the items. Secondly, repetition is also captured in the rating scale format of the items. Therefore, the choice of cut off scores also informs about the repetitive nature of the behaviour under question. When choosing a lenient cut off score (e.g., students reporting bullying others at least once) it is possible to identify occasional bullies. In contrary, when choosing a strict cut off score (e.g., students reporting bullying others at least two or three times per month) it is possible to identify frequent bullies. As pointed out by Dooley et al. (2009) the criterion of repetition gets more complex when considering cyberbullying. In cyberspace, one single negative action from a perpetrator (e.g., setting up a nasty webpage) might have a much greater impact because it potentially reaches an uncontrollable huge audience and can be uncontrollably and easily repeated. Therefore, it is important to find out whether the majority of cyberbullies usually act out negative behaviors only once or whether they repeat their behaviour at least two or three times per month. To the best of our knowledge no study ever compared the number of identified bullies and cyberbullies using both global item versus specific items assessments and lenient versus strict cut off scores.

In general, specific item measurements yield higher prevalence rates compared with global item assessments. In Italy, Nocentini, Menesini & Calussi (2009) found 18% occasional (3% frequent) cyberbullies when using a global item measurement and 51% occasional (13% frequent) cyberbullies when using ten specific items in a study comprising 11 to 21 year old students. In Sweden, Slonje and Smith (2008) identified only a small increase in the number of cybervictims when using four specific items (6%) compared with using a global item (5%), applying a lenient cut off score for the whole sample.

The theoretical importance of co-occurrences of bullying and cyberbullying

Conceptually, cyberbullying can be considered as a distinct phenomenon or as a sub-form of bullying with electronic devices. Thus, if cyberbullying is rather a sub-form of bullying than a distinct phenomenon, it should co-occur with bullying and the majority of cyberbullies should also classify themselves as bullies. Indeed, several studies have already shown that being a cyberbully co-occurred with being a traditional bully (Grading et al., 2009, in press; Katzer, Fetchenhauer, & Belschak, 2009; Kowalski, Limber, & Agatston, 2008; Pornari & Wood, 2010; Raskauskas & Stolz, 2007; Smith et al. 2008; Twyman, Saylor, Taylor, & Comeaux, 2009). Grading, Strohmeier, and Spiel (2009) differentiated groups of bullies depending on their involvement in traditional bullying and cyberbullying and showed that those students who bullied others both traditionally and in cyberspace (labelled as "combined bullies") had most adjustment problems compared with all other students. In a second study Grading, Strohmeier, and Spiel (in press) again identified a substantial number of combined bullies. Compared with traditional bullies, combined bullies pursued more instrumental motives (like power, affiliation and fun) when harassing others indicating that these students are comparatively conscious about their actions. They bully others not only to cope with their anger, but also to reach particular goals.

However, studies reporting co-occurrences varied greatly regarding samples, measurement methods, cut off scores and analytic strategies. Therefore, we do not know whether the reported co-occurrences have also been (partly) caused by differences in methodological approaches. Therefore, it is necessary to investigate co-occurrences based on more than one measurement method and more than one cut off score. Furthermore, it is important to reinvestigate whether the group of combined bullies is a risk group for adjustment problems (overt and relational aggression) irrespective of methodology used.

The present study

The overall goal of the present study was to investigate whether and to what extent measurement methods and cut off scores influence the number of students identified as cyberbullies and bullies. Because past studies demonstrated a considerable overlap between bullying and cyberbullying, our second aim was to investigate whether and to what extent this co-occurrence was produced by the measurement methods and the cut off scores used. Finally, we explored whether the groups identified as cyberbullies, bullies, or combined bullies showed different or similar levels of overt and relational aggression.

In a first step, we compared frequencies based on one global item with frequencies based on three specific behaviour based items. These two measurement methods were chosen because they represent the most often used strategies when applying self assessments in bullying research (Solberg & Olweus, 2003). Conceptually, for both bullying and cyberbullying the global item also comprises the behaviours captured with the specific items. Therefore, we expected higher frequencies for the global item measurement compared with frequencies based on single specific items. Regarding gender, we expected boys to score higher in global and physical bullying than girls (Monks, Smith, Naylor, Barter, Ireland, & Cyne, 2009); concerning cyberbullying we did not have any specific expectations because evidence to

date has been inconclusive and specific items varied greatly between studies. Some studies found more boys cyberbullying others than girls (Grading et al., 2009; Katzer, Fetchenhauer, & Belschak, 2009) while others reported no gender differences (Grading et al., in press; Smith et al., 2008) and still others reported higher cyberbullying rates for girls compared with boys (Pornari & Wood, 2010).

In a second step, we additionally classified students as bullies or cyberbullies based on two cut off scores (lenient vs. strict). The two cut off scores were chosen because they are able to differentiate occasional from frequent bullies (Ortega, Eliepe, Mora-Merchán, Calmaestra, & Vega, 2009). The numbers of occasional and frequent bullies were compared for both global vs. specific behaviour based items assessments to explore the impact of methodological approaches on results. Obviously, we expected to identify more students as bullies and cyberbullies when applying a lenient vs. a strict cut off score.

In a third step, we investigated the co-occurrence of bullying and cyberbullying to find out whether cyberbullying is rather a sub-form of bullying or a distinct phenomenon. To rule out the impact of methodological approaches on results, we compared co-occurrences based on two measurement methods (global vs. specific items) and two cut off scores (lenient vs. strict). Based on theoretical considerations and previous empirical studies (e.g., Grading et al., 2009, in press; Raskauskas & Stolz, 2007; Smith et al. 2008), we expected a high overlap between being a cyberbully and being a traditional bully. Therefore, we looked at the frequencies of four bully-groups: no bully, cyberbully only, traditional bully only and combined bully (both traditional and cyber). For both global item vs. specific items measurement and lenient vs. strict cut off scores we expected to find a small group of cyberbullies only but a rather big group of combined bullies.

In a forth step, we compared these bully-groups in overt and relational aggression to reinvestigate findings on combined bullies. Based on earlier studies (Grading et al., 2009, in press) we expected combined bullies to score higher in overt and relational aggression compared with the other bully-groups. We expected to find these results irrespective of measurement method and cut off scores. Moreover, we expected boys to score higher in overt aggression than girls (Card, Stucky, Sawalani, & Little, 2008). In addition, we explored interaction effects between bully-groups and gender.

Method

Sample and Procedure

We used data from a national intervention evaluation study, ViSC, in Austria (Spiel & Strohmeier, under review). 1150 grade 5 to 8 students (551 girls, 599 boys) aged 10 to 15 ($M = 12.39$, $SD = 1.16$) in eleven different schools located in three federal states of Austria (Carinthia, Salzburg and Vienna) participated. The sample was culturally diverse and represented the population well; 54.8% of the pupils nominated German as mother tongue, with 37 different languages nominated by the remainder. 80.2 percent of students used the mobile phone and 60 percent of students used the internet, both at least once a day.

Participation was voluntary and based on active parental consent. After acceptance by the local school council and school principals, letters were sent to parents via the class teachers and brought back to school by students. In Austria, participation rates are usually high. 95% of eligible students participated in the study. The data were collected in May 2009 (about one month before the end of the school year) through Internet-based questionnaires which were completed during one regular school hour in the school's computer lab under the supervision of one or two trained research assistants. The order of the items within scales was counterbalanced to avoid ordering effects.

Instruments

All scales within this study recorded the frequency of behaviours within the last two months. The response format for all items ranged from 0 (never), through 1 (one or two times), 2 (two or three times a month), 3 (once a week) to 4 (nearly every day).

Bullying

Bullying was measured by modified items of the Olweus bully/victim questionnaire (Olweus, 1996). Because no exact translation of the term "bullying" exists in the German language, the term was avoided in the questionnaire. Instead, "bullying" was described as "hurting or insulting" (German: "beleidigen oder verletzen"). The combination of these two German terms has a similar connotation like "bullying" or "harassing" in English and is easily comprehensible for preadolescents.

Bullying - global. One global item was used to measure bullying behaviour. "How often have you insulted or hurt other students during the last two months?"

Bullying - specific, ($\alpha = .72$). Three specific forms of bullying behaviours were measured:

1. How often have you insulted or hurt other students by verbally harassing them during the last two months? (verbal)
2. How often have you insulted or hurt other students by physically harassing them during the last two months? (physical)
3. How often have you insulted or hurt other students by socially excluding them during the last two months? (exclusion)

Cyberbullying

Corresponding to bullying, cyberbullying was measured by one global item and three specific items.

Cyberbullying - global. One global item was used to measure bullying others by electronic means. "How often have you insulted or hurt other students by sending mean text messages, e-mails, videos or photos to them during the last two months?"

Cyberbullying - specific, ($\alpha = .93$). Three specific electronic means of exerting cyberbullying behaviour were measured:

1. How often have you insulted or hurt other students by mean calls during the last two months? (cyber call)
2. How often have you insulted or hurt other students by mean text messages during the last two months? (cyber text)
3. How often have you insulted or hurt other students by mean videos or photos during the last two months? (cyber video/photo)

The factorial structure of the bullying and cyberbullying items were checked via confirmatory factor analyses using Mplus 5.0 (Muthen & Muthen, 2007). First, the model fit of a one factor solution comprising both the global and the three specific bullying items and the global and the three specific cyberbullying items was checked. This one factor solution comprising eight items showed a very poor fit, $\chi^2(9) = 1621.06$, $p < 0.01$, CFI = 0.66, RMSEA = 0.264. Second, the model fit of a one factor solution comprising both the three specific bullying items and the three specific cyberbullying items was checked. This one factor solution comprising six items again showed a very poor fit, $\chi^2(9) = 669.20$, $p < 0.01$, CFI = 0.82, RMSEA 0.253. Third, the model fit of a two factor solution comprising both the global and the specific bullying and cyberbullying items was analysed. The global and the three specific bullying items were modelled to form a latent bullying factor and the global and the three specific cyberbullying items were modelled to form a latent cyberbullying factor. This model still showed rather a poor fit, $\chi^2(19) = 211.91$, $p < 0.01$, CFI = 0.96, RMSEA 0.09. Fourth, the model fit of a two factor solution comprising only the three specific bullying items and the three specific cyberbullying items was analyzed. This model showed an excellent fit, $\chi^2(8) = 15.53$, $p = 0.05$, CFI = 0.99, RMSEA 0.03. Thus, we felt confident to use the global and specific items separately in the subsequent analyses.

Aggressive behaviour

To validate our findings, a self report instrument developed by Crick and Grotpeter (1996) for victimization was changed into an assessment of aggression and slightly modified. Statements of different aggressive behaviors were followed by questions regarding the frequency of pursuing these behaviors (How often have you done that during the last two months?).

Overt aggression ($\alpha = .76$) was measured with three items.

1. Some kids hit other kids.
2. Some kids push or shove other kids.
3. Some kids kick or pull hair.

Relational aggression ($\alpha = .83$) was measured with five items.

1. Some kids leave other kids out on purpose when it's time to play or do an activity.
2. Some kids who are mad at somebody get back at that kid by not letting him or her in his group anymore.
3. Some kids tell lies about another kid to make other kids not like him/her anymore.
4. Some kids tell other kids they won't like him/her anymore unless they do what they want.
5. Some kids keep others from liking a kid by telling mean things about him/her.

Results

Involvement in bullying and cyberbullying

In the first step, the frequency distributions of bullying and cyberbullying, measured by the global item or three specific items were explored. Because of very low cell frequencies in the answer categories "two or three times per month", "once a week" and "nearly every day", we collapsed these to one category "at least two or three times a month". The percentages of students who reported being involved in the different behaviours - as well as the frequency distribution of these forms by gender - are shown in Table 1 for bullying and cyberbullying.

Table 1. Frequency of different forms of bullying,

Table 1. Frequency of different forms of bullying, and gender differences

	Whole sample N= 1150		Girls N = 551		Boys N = 599			
Forms of bullies	never	never	one or two times	at least two or three times a month	never	one or two times	at least two or three times a month	χ^2 (df=2)
Cyberbullying – global item	93.7	93.3	6.0	0.7	94.0	3.7	2.3	8.00*
Cyberbullying – specific items								
Cyber call	89.1	88.0	6.0	6.0	90.2	4.0	5.8	2.43
Cyber text	89.3	88.4	6.2	5.4	90.2	4.2	5.7	2.36
Cyber video/photo	92.7	93.6	1.6	4.7	91.8	3.2	5.0	2.94
Bullying – global item	52.5	51.2	39.9	8.9	53.8	32.1	14.2	12.24**
Bullying – specific items								
Verbal	59.7	59.0	31.0	10.0	60.4	27.4	12.2	2.67
Exclusion	79.4	76.6	18.5	4.9	81.8	14.2	4.0	4.80
Physical	82.2	88.2	8.7	3.1	76.8	16.7	6.5	25.67***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. The time frame for answering the items was "in the last two months".

According to the global item measurement, cyberbullying was reported much more rarely compared with bullying. While 48.8% of girls and 46.2% of boys reported being involved in bullying, only 6.7% of girls and 6% of boys reported being involved in cyberbullying at least one or two times during the last two months. Concerning the specific items measurement, cyberbullying was again reported comparatively rarely. 10.9% students indicated that they had harassed others with cyber calls, 10.7% with cyber text messages and 7.3% with cyber videos/photos. In contrary, 40.3% of students indicated that they had harassed others verbally, 20.6% socially and 17.8% physically. When comparing the global measurement with the specific item measurement, it is remarkable that while for bullying all specific item frequencies were lower than the global item frequency, for cyberbullying all specific item frequencies were higher than the global item frequency (see Table 1).

Gender differences were found for global cyberbullying, global bullying and physical bullying. More boys than girls cyberbullied and bullied others at least two or three times per month and more boys were involved in physical bullying compared with girls (see Table 1).

Classification of students: bullies and cyberbullies

For further analyses, the three specific behavioural items measuring cyberbullying and bullying were aggregated. A student was considered to be a cyberbully, measured by the specific items, if he or she reported to be involved in at least one form of cyberbullying. A student was considered to be a bully, measured by the specific items, if he or she reported to be involved in at least one form of bullying. Similarly, a student was considered to be a cyberbully, measured by global item, if he or she reported to be involved in cyberbullying. A student was considered to be a bully, measured by global item, if he or she reported to be involved in bullying. These identifications were accomplished by using two different cut offs. At first, we used a lenient cut off "one or two times" and thus classified "occasional cyberbullies" and "occasional bullies". Second, we used a strict cut off "two or three times in the last two months" and thus classified "frequent cyberbullies" and "frequent bullies". As a result, eight different classifications of students were compared (see Table 2).

Table 2. Number (Percentage) of students identified with two measurement methods and two cut off scores

N = 1150	Global item		Specific items	
	Lenient cut off	Strict cut off	Lenient cut off	Strict cut off
	N (%)	N (%)	N (%)	N (%)
cyberbully	73 (6.3)	18 (1.6)	186 (16.2)	87 (7.6)
bully	546 (47.5)	134 (11.7)	565 (49.1)	153 (13.3)

Note: The lenient cut off score identifies students involved in (cyber-) bullying at least "one or two times" during the last two months, thus generating "occasional cyberbullies" and "occasional bullies". The strict cut off score identifies students involved in (cyber-) bullying at least "two or three times a month" during the last two months, thus generating "frequent cyberbullies" and "frequent bullies".

In descriptively comparing the two cut off score identifications, always fewer students were identified as cyberbullies or bullies when using the strict cut off compared with the lenient cut off score. Moreover, with the specific items assessment generally more cyberbullies and bullies were identified compared with the global item assessment. However, the discrepancy between the two measurement methods was particularly high for identifying cyberbullies (details see Table 2).

Co-occurrence of bullying and cyberbullying

For this analysis, we built groups of bullies in combining being a cyberbully (no/yes) with being a bully (no/yes), resulting for students in being either no bully, a cyberbully only, a bully only or a combined bully (see Table 3). This was done for the measurement by global item, as well as for the measurement by specific items, in using either the lenient cut off (at least one or two times) or the strict cut off (at least two or three times a month).

Table 3. Number of students identified with two measurement methods and two cut off scores, controlling for bullying involvement ("bullygroups")

N = 1150	Configurations		Global item		Specific items	
	Being	Being	Lenient	Strict cut	Lenient cut	Strict cut
	a cyberbully	a bully	cut off	off	off	off
			N (%)	N (%)	N (%)	N (%)
no bully	no	no	592 (51.5)	1010 (87.8)	526 (45.7)	941 (81.8)
cyberbully only	yes	no	12 (1.0) ^A	6 (0.5) ^A	59 (5.1) ^A	56 (4.9)
bully only	no	yes	485 (42.2)	122 (10.6)	438 (38.1)	122 (10.6)
combined bully	yes	yes	61 (5.3) ^T	12 (1.0) ^T	127 (11.0) ^T	31 (2.7) ^T
χ^2 (df), p			40.70 (1), p<.001	53.76 (1), p<.001	32.56 (1), p<.001	40.68 (1), p<.001

Note: The lenient cut off score identifies students involved in (cyber-) bullying at least "one or two times" during the last two months, thus generating "occasional cyberbullies only", "occasional bullies only" and "occasional combined bullies". The strict cut off score identifies students involved in (cyber-) bullying at least "two or three times a month" during the last two months, thus generating "frequent cyberbullies only", "frequent bullies only" and "frequent combined bullies". Superscripts mark types (T) and antitypes (A) of first-order CFA, Bonferroni adjusted $\alpha = .0125$.

To investigate the co-occurrence of being a bully and a cyberbully, we used the Configural Frequency Analysis (CFA). CFA (Lienert, 1969; von Eye, 2002) is a multivariate method of analysis which is able to check for local relations in categorical data. Concretely, CFA compares the observed cell frequencies of all variable combinations, called configurations, with their expected frequencies estimated under a chance model. A chance model is contradicted if variable relationships assumed not to exist, do exist (for description of methodology and examples see for instance Spiel & von Eye, 2000; von Eye et al., 2008). Configurations that are more frequent relative to some expectations are termed "types", while less frequent configurations are termed "antitypes".

Applying first order CFAs for each of the four columns shown in Table 3 the base model of independence of the two variables being a bully (no, yes) and being a cyberbully (no, yes) was always contradicted (see Table 3 for overall χ^2 test statistics). This demonstrates that being a bully and being a cyberbully systematically co-occurs. More detailed, the existence of one type, namely being a combined bully, was suggested for all measurement methods and cut off scores. This means, that more students than expected by chance are combined bullies.

Except for the specific items measurement and the strict cut off always one antitype, namely being a cyberbully only, was suggested. This means that – except for the specific items measurement and strict cut off score – fewer students than expected by chance were identified as cyberbullies only.

Aggressive behaviour in bully groups

To validate our findings, we analysed whether students belonging to particular groups of bullies (e.g., cyberbullies only, bullies only, combined bullies or no bullies) differ regarding their level of overt and relational aggression. We analysed these four bully-groups separately for the identification by global item and specif items as well as for both the lenient and the strict cut off scores. Thus, four MANOVAs are consecutively reported.

Overt and relational aggression in occasional bully groups (global item)

To check for differences in aggression between the four bully groups (no bully, occasional cyberbully only, occasional bully only and occasional combined bully) measured by global item and identified by the lenient cut off, a MANOVA with bully group and gender as factors and overt and relational aggression as dependent variables was conducted. Application of a multivariate test using Pillais Criterion revealed a significant effect for bully group, $F(6, 2284) = 30.31$, $p < 0.001$, $\eta^2 = .07$, for gender, $F(2, 1141) = 5.80$, $p < 0.01$, $\eta^2 = .01$ and for the bully group x gender interaction, $F(6, 2284) = 3.23$, $p < 0.01$, $\eta^2 = .01$. Subsequent univariate analyses showed an effect for bully group on both overt aggression, $F(3, 1142) = 52.91$, $p < 0.001$, $\eta^2 = .12$, and relational aggression, $F(3, 1142) = 42.21$, $p < 0.001$, $\eta^2 = .12$.

= .10. Univariate analyses showed an effect for gender on both overt aggression, $F(1, 1142) = 10.10$, $p < 0.01$, $\eta^2 = .01$, and relational aggression, $F(1, 1142) = 8.34$, $p < .01$, $\eta^2 = .01$. Univariate analyses showed an effect for bully group x gender interaction on overt aggression, $F(3, 1142) = 3.48$, $p < 0.05$, $\eta^2 = .01$.

Table 4. Aggression of occasional bullygroups by gender, separately identified by global item or specific items

Identification by	no bully		occasional cyberbully		occasional bully only		occasional combined		F value
global item	(N=592)		only		(N=485)		bully		
			(N=12)				(N=61)		
Overt aggression	.23 (.49) _a		.42 (.47)		.65 (.76) _b		.95 (1.16) _c		52.91**
Relational aggression	.15 (.36) _a		.47 (.72)		.38 (.53) _b		.79 (.99) _c		42.21**
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	
	(N=278)	(N=314)	(N=4)	(N=8)	(N=236)	(N=249)	(N=33)	(N=28)	
Overt aggression	.13 (.32)	.31 (.58)	.25 (.32)	.50 (.53)	.45 (.58)	.84 (.86)	.68 (1.25)	1.25	3.48*
								(1.25)	
Identification by	no bully		occasional cyberbully		occasional bully only		occasional combined		
specific items	(N=526)		only		(N=438)		bully		
			(N=59)				(N=127)		
Overt aggression	.20 (.48) _a		.27 (.55) _a		.65 (.74) _b		.86 (.98) _c		59.16**
Relational aggression	.14 (.38) _a		.24 (.57) _{ab}		.36 (.48) _b		.65 (.79) _c		42.45**
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	
	(N=254)	(N=272)	(N=27)	(N=32)	(N=201)	(N=237)	(N=69)	(N=58)	
Overt aggression	.12 (.31)	.28 (.58)	.17 (.23)	.35 (.71)	.45 (.59)	.82 (.80)	.61 (.83)	1.16	4.38**
								(1.07)	

Note: Row means with different subscripts are significantly different at least at $p < .05$; Aggression scales range from 0 to 4

Alpha corrected Bonferroni post hoc tests revealed that occasional combined bullies scored higher in overt and relational aggression compared with occasional bullies only. Moreover, occasional bullies only scored higher in overt and relational aggression compared with non bullies. Concerning gender, boys scored higher in overt ($M=.58$, $SD=.80$) and relational aggression ($M=.31$, $SD=.58$) compared with girls ($M=.30$, $SD=.54$; respectively $M=.26$, $SD=.43$). Moreover, the difference in overt aggression between boys and girls heightened while the risk of bullying involvement increased. Means and standard deviations are shown in Table 4.

Overt and relational aggression in occasional bully groups (specific items)

To check for differences in aggression between the four bully groups (no bully, occasional cyberbully only, occasional bully only and occasional combined bully) measured by specific items and identified by the lenient cut off, a MANOVA with bully group and gender as factors and overt and relational aggression as dependent variables was conducted. Application of a multivariate test using Pillais Criterion revealed a significant effect for the bully group, $F(6, 2284) = 31.94$, $p < 0.001$, $\eta^2 = .08$, for gender, $F(2, 1141) = 18.20$, $p < 0.001$, $\eta^2 = .03$ and for the bully group x gender interaction, $F(6, 2284) = 3.58$, $p < 0.01$, $\eta^2 = .01$. Subsequent univariate analyses showed an effect for bully group on both overt aggression, $F(3, 1142) = 59.16$, $p < 0.001$, $\eta^2 = .14$, and relational aggression, $F(3, 1142) = 42.45$, $p < 0.001$, $\eta^2 = .10$. Univariate analyses showed an effect for gender on overt aggression, $F(1, 1142) = 32.81$, $p < 0.001$, $\eta^2 = .03$. Univariate analyses showed an effect for bully group x gender interaction on overt aggression, $F(3, 1142) = 4.38$, $p < 0.01$, $\eta^2 = .01$.

Alpha corrected Bonferroni post hoc tests revealed that occasional combined bullies scored higher in overt and relational aggression compared with occasional bullies only. Moreover, occasional bullies only scored higher in overt aggression compared with occasional cyberbullies only, while occasional cyberbullies only and non bullies did not differ in overt aggression. Regarding relational aggression, occasional bullies only scored higher in relational aggression compared with non bullies, while occasional bullies and occasional cyberbullies did not differ in relational aggression. Concerning gender, boys scored higher in overt aggression ($M=.58$, $SD=.80$) compared with girls ($M=.30$, $SD=.54$). Moreover, the difference in overt aggression between boys and girls heightened while the risk of bullying involvement increased. Means and standard deviations are shown in Table 4.

Overt and relational aggression in frequent bully groups (global item)

To check for differences in aggression between the four bully groups (no bully, frequent cyberbully only, frequent bully only and frequent combined bully) measured by global item and identified by the strict cut off, a MANOVA with bully group and gender as factors and overt and relational aggression as dependent variables was conducted. Application of a multivariate test using Pillais Criterion revealed a significant effect for the bully group, $F(6, 2284) = 60.03$, $p < 0.001$, $\eta^2 = .14$, and for the bully group \times gender interaction, $F(6, 2284) = 5.91$, $p < 0.001$, $\eta^2 = .02$. Subsequent univariate analyses showed an effect for bully group on both overt aggression, $F(3, 1142) = 111.92$, $p < 0.001$, $\eta^2 = .23$, and relational aggression, $F(3, 1142) = 75.59$, $p < 0.001$, $\eta^2 = .17$. Univariate analyses showed an effect for bully group \times gender interaction on overt aggression, $F(3, 1142) = 7.82$, $p < 0.001$, $\eta^2 = .02$, and on relational aggression, $F(3, 1142) = 8.48$, $p < .001$, $\eta^2 = .02$.

Table 5. Aggression of frequent bullygroups by gender, separately identified by global item or specific items

Identification by	no bully		frequent cyberbully only		frequent bully only		frequent combined bully		F value
global item	(N=1010)		(N=6)		(N=122)		(N=12)		
Overt aggression	.32 (.52) _a		.61 (.33) _a		1.31 (1.05) _b		2.08 (1.54) _c		11.92**
Relational aggression	.22 (.40) _a		.50 (.49) _{ab}		.66 (.79) _b		1.78 (1.29) _c		75.59**
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	
	(N=501)	(N=509)	(N=1)	(N=5)	(N=46)	(N=76)	(N=3)	(N=9)	
Overt aggression	.23 (.40)	.41 (.60)	.33 (-)	.67 (.33)	.93 (.88)	1.54 (1.08)	2.89 (1.64)	1.81 (1.51)	7.82**
Relational aggression	.22 (.34)	.22 (.46)	.20 (-)	.56 (.52)	.56 (.63)	.73 (.88)	2.87 (1.10)	1.42 (1.19)	8.48**
Identification by	no bully (N=941)		frequent cyberbully only		frequent traditional bully		frequent combined bully		
specific items			(N=56)		only (N=122)		(N=31)		
Overt aggression	.31 (.51) _a		.53 (.72) _b		1.23 (.98) _c		1.47 (1.37) _{cd}		109.22**
Relational aggression	.20 (.37) _a		.42 (.68) _b		.67 (.71) _c		1.15 (1.22) _d		72.09**
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	
	(N=455)	(N=486)	(N=29)	(N=27)	(N=55)	(N=67)	(N=12)	(N=19)	
Overt aggression	.20 (.36)	.41 (.59)	.34 (.44)	.73 (.90)	.85 (.82)	1.53 (1.00)	1.61 (1.28)	1.39 (1.45)	7.18**

Note: Row means with different subscripts are significantly different at least at $p < .05$; Aggression scales range from 0 to 4

Alpha corrected Bonferroni post hoc tests revealed that frequent combined bullies scored higher in overt and relational aggression compared with frequent bullies only. Moreover, frequent bullies only scored higher in overt and relational aggression compared with non bullies. Moreover, the boys and girls reported different aggression levels depending on the bully group being involved: while boys exceeded girls in overt aggression and relational aggression in the no bully, frequent cyberbully only and frequent bully only group, girls exceeded boys in overt and relational aggression in the combined bully group. Means and standard deviations are shown in Table 5.

Overt and relational aggression in frequent bully groups (specific items)

To check for differences in aggression between the four bully groups (no bully, frequent cyberbully only, frequent bully only and combined bully) measured by specific items and identified by the strict cut off, a MANOVA with bully group and gender as factors and overt and relational aggression as dependent variables was conducted. Application of a multivariate test using Pillais Criterion revealed a significant effect for the bully group, $F(6, 2284) = 54.31$, $p < 0.001$, $\eta^2 = .13$, for gender, $F(2, 1141) = 8.06$, $p < 0.001$, $\eta^2 = .01$ and for the bully group \times gender interaction, $F(6, 2284) = 6.24$, $p < 0.01$, $\eta^2 = .02$. Subsequent univariate analyses showed an effect for bully group on both overt aggression, $F(3, 1142) = 109.22$, $p < 0.001$, $\eta^2 = .22$, and relational aggression, $F(3, 1142) = 72.09$, $p < 0.001$, $\eta^2 = .16$. Univariate analyses showed an effect for gender on overt aggression, $F(1, 1142) = 12.24$, $p < 0.001$, $\eta^2 = .01$. Univariate analyses showed an effect for bully group \times gender interaction on overt aggression, $F(3, 1142) = 7.18$, $p < 0.01$, $\eta^2 = .02$.

Alpha corrected Bonferroni post hoc tests revealed that concerning relational aggression, frequent combined bullies scored higher compared with frequent bullies only, who scored higher compared with frequent cyberbullies only, who scored higher than no bullies. Regarding overt aggression the same results were found, with the exception of frequent combined bullies reporting equal levels compared to frequent bullies. Concerning gender, boys scored higher in overt

aggression ($M=.58$, $SD=.80$) compared with girls ($M=.30$, $SD=.54$). Moreover, the boys and girls reported different aggression levels depending on the bully group being involved: while boys exceeded girls in overt aggression in the no bully, frequent cyberbully only and frequent bully only group, girls exceeded boys in overt and relational aggression in the frequent combined bully group. Means and standard deviations are shown in Table 5.

Discussion

This study investigated whether and to what extent measurement methods and cut off scores influence the number of students identified as cyberbullies and bullies. Because self assessments are most often used to identify bullies or cyberbullies (e.g., Solberg & Olweus, 2003; Välimäki, 2010) we compared results of a global item assessment with results of a specific items measurement. Because the definition and measurement of cyberbullying are intertwined issues (Menesini & Nocentini, 2009) the present study contributes to existing literature in important ways.

First of all and in line with previous studies (Grading, et al., 2009, in press; Li, 2006; Raskauskas & Stoltz, 2007; Smith et al., 2008), we found cyberbullying to occur rather infrequently compared with bullying irrespective of measurement method. However, when comparing the frequencies of the global item and specific items assessments between bullying and cyberbullying a remarkable difference emerged. The global item measuring cyberbullying produced generally lower frequencies compared with each of the three specific items covering concrete aspects of cyberbullying. For bullying the opposite was observed. Here, the global item produced higher frequencies compared with each of the three specific items. Thus, it seems that Austrian students might have an unclear comprehension of the global cyberbullying construct because they might not have subsumed each of the specific cyberbullying aspects under the global concept. We do not have many possibilities to compare these results with other studies, because not many studies compared frequency rates of global item and specific items assessments (e.g., Slonje & Smith, 2008) on item level. In Sweden, Slonje & Smith (2008) identified more students with the global cyberbullying item compared with four specific cyberbullying items using a subsample. Anyway, our study demonstrates that the global item assessment might underestimate frequency rates of cyberbullying at least in Austria and should therefore be interpreted with caution.

When looking at gender differences we found divergent results for cyberbullying depending on measurement method. While more boys frequently cyberbullied others according to the global item, no gender differences were found according to the three specific items. These inconsistencies are in line with previous studies. Some studies also found more boys cyberbullying others than girls (Grading et al., 2009; Katzer, Fetchenhauer, & Belschak, 2009; Li, 2006, 2007; Slonje & Smith, 2008), while others reported no gender differences (Grading et al., in press; Raskauskas & Stoltz, 2007; Smith et al., 2008; Topçu, Erdur-Baker, & Çapa-Aydin, 2008) and still others reported higher cyberbullying rates for girls compared with boys (Pornari & Wood, 2010). Therefore, we speculate that gender differences in cyberbullying research might at least partly be attributed to different measurement methods used.

Second, we additionally investigated the impact of cut off scores on the number of identified bullies and cyberbullies. Two cut off scores (lenient vs. strict) were chosen because they are often used in research (e.g., Solberg & Olweus, 2003) to differentiate occasional from frequent bullies (Ortega, et al, 2009). Trivially and as expected the lenient cut off score produced more bullies and cyberbullies compared with the strict cut off score irrespective of measurement method. However and unexpectedly, there was a complex interaction between measurement method and cut off score for cyberbullying. While for bullying the lenient cut off score produced approximately the same number of bullies for global item (48%) and specific items assessment (49%), for cyberbullying much fewer cyberbullies were identified with the global item (6%) compared with the specific items assessment (16%). For bullying, the strict cut off score also produced about the same number of bullies for global item (12%) and specific items assessment (13%). However, when looking at cyberbullying again much fewer cyberbullies were identified with the global item (2%) compared with the specific items assessment (8%). It should be noted that this complex interaction might not be attributed to the number of specific items used because both for bullying and cyberbullying exactly the same number of items were used in the present study. Again, there are only few studies with which we are able to compare our results (Nocentini, Menesini, & Calussi, 2009; Salin, 2001; Slonje & Smith, 2008, Solberg & Olweus, 2003). Salin (2001) focused on workplace victimization, Solberg and Olweus (2003) on traditional bullying and victimization. Slonje and Smith (2008) identified only a small increase in the number of cybervictims when using specific items (6%) compared with using a global item (5%), applying a lenient cut off score for the whole sample. Nocentini et al (2009) directly compared the number of cyberbullies identified with global and specific items assessment depending on exactly the same two cut off scores as in the present study. The authors reported generally higher frequencies of cyberbullying in their sample compared with the present study. Despite of these level differences, they also found the same complex interaction between measurement methods and cut off scores as in the present study. For cyberbullying the lenient cut off produced fewer cyberbullies when using a global item (18%) compared with specific items (51%), however, these differences were more pronounced when using the strict cut off score as only 3% of cyberbullies were identified with the global item, but 13% with the specific items assessment. Thus, we believe that these results point to the importance of measurement methods and cut off scores for identifying cyberbullies. Based on the results of the present study and of the study conducted by Nocentini et al (2009) the difference between global item and specific items seems to be especially pronounced when using a strict cut off score. We believe that this clearly demonstrates that numbers of cyberbullies can not be directly compared between studies without taking into account measurement method (global vs. specific items) and cut off scores (lenient vs. strict). In addition, it is possible that these differences between countries using a lenient cut off might be attributed to the specific terms and phrases used in the respective languages as in both Italian and German – contrary to Swedish, no exact translation of the term “cyberbullying” exists (Smith et al., 2002).

Co-occurrence of bullying and cyberbullying

Third, we also investigated the co-occurrence of bullying and cyberbullying because we expected a high overlap regarding the involvement in being a cyberbully and a traditional bully (e.g., Grading et al., 2009, in press;

Raskauskas & Stolz, 2007; Smith et al. 2008). We looked at the frequencies of four bully-groups (no bully, cyberbully only, traditional bully only and combined bully) and checked whether measurement methods and cut off scores had an impact on the number of identified students in each group. As expected, frequencies varied depending on measurement methods and cut off scores used ranging between 0.5% to 5% for cyberbullies only, between 1% to 11% for combined bullies, between 10.6% to 42% for bullies only and between 46% to 88% for uninvolved students. Irrespective of measurement method and cut off score used, more students than expected by chance were identified as combined bullies. On contrary, when using the global item or the specific items in combination with the lenient cut off score, fewer students than expected by chance were identified as cyberbullies only. Interestingly and unexpectedly, when using specific items assessment and strict cut off score fewer students were identified as combined bullies (N=31) than cyberbullies only (N=56). Thus, the pattern of results changed for this particular methodological approach.

Fourth, we compared these four bully-groups (no bully, cyberbully only, traditional bully only and combined bully) regarding their aggression level. Based on previous studies (Grading et al., 2009; in press) we expected combined bullies to score highest in overt and relational aggression. We wanted to investigate whether this finding would remain irrespective of methodological approach used for classification. For all four groups of students we found very consistent patterns of results. As predicted and inline with previous studies (Grading et al., 2009; in press) students not involved in bullying showed lowest levels of aggressive behaviour, followed by bullies only and combined bullies, which showed highest levels of aggressive behaviour. Gender was also an important variable. When using the lenient cut off score, male combined bullies were much more aggressive compared with female combined bullies. This difference was much smaller in the three other bully-groups. However, when using the strict cut off score, these gender differences changed in the opposite direction for combined bullies. Although only very few girls were classified as frequent combined bullies, these few girls showed very high aggression levels compared to boys.

Limitations of the present study

To begin with, our study relied on self assessments only. Although natural observations or peer nominations are also important in bullying research (Pellegrini & Bartini, 2000), most studies on cyberbullying use self assessments which are also recommended for reporting prevalence rates for bullying (Solberg & Olweus, 2003). A second limitation is the use of only three specific items to measure bullying and cyberbullying beside the global items. Obviously, these three items do not fully capture the whole constructs. Nevertheless, the particular three items covered relevant aspects of bullying (verbal, social and physical bullying) and cyberbullying (voice-, text- and picture based cyberbullying, see also Menesini, Nocentini, & Calussi, in press). Furthermore, we think the use of solely quantitative methods in cyberbullying research is also a limitation. Future studies should also use qualitative methods to be able to better understanding the concept of cyberbullying in Austrian students, to be able to validly measure the concept in future studies – ideally with specific behaviour based items.

References

- Card, N. A., Stucky, B. D., Sawalani, G. M., & Little, T. D. (2008). Direct and indirect aggression during childhood and adolescence: A meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Development, 79*, 1185-1229.
- Crick, N. R., & Grotpeter, J. K. (1996). Children's treatment by peers: Victims of relational and overt aggression. *Development and Psychopathology, 8*, 367-380.
- Dooley, Pyzalski, J., & Cross, D. (2009). Cyberbullying versus face-to-face bullying: A theoretical and conceptual review. *Zeitschrift für Psychologie / Journal of Psychology, 217*, 182-188.
- Grading, P., Strohmeier, D., & Spiel, C. (2009). Traditional bullying and cyberbullying: Identification of risk groups for adjustment problems. *Zeitschrift für Psychologie / Journal of Psychology, 217*, 205-213.
- Grading, P., Strohmeier, D., & Spiel, C. (in press). Underlying motives for bullying others in cyberspace: A study on bullies and bully-victims in Austria. In Q. Li, D. Cross, & P. Smith (Eds.), *Bullying in the global village: Research on cyberbullying from an international perspective*.
- Graham, S., Bellmore, A., & Juvonen, J. (2003). Peer victimization in middle school: When self- and peer views diverge. *Journal of Applied School Psychology, 19*, 117-138.
- Katzer, C., Fetchenhauer, D., & Belschak, F. (2009). Cyberbullying in Internet-Chatrooms - Wer sind die Täter? [Internet chatrooms: A new playground for bullies. A comparison of bullying behavior in school and in chatrooms from the perpetrators' perspective.] *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie, 41*, 33-44.
- Kowalski, R. M., & Limber, S. P. (2007). Electronic bullying among middle school students. *Journal of Adolescent Health, 41*, 22-30.
- Kowalski, R. M., Limber, S. P., & Agatston, P. W. (2008). *Cyber bullying: Bullying in the digital age*. Malden, MA: Blackwell.
- Kaernae, A., Voeten, M., Poskiparta, E., Little, T.D., Kaljonen, A., & Salmivalli, C. (in press). A large-scale evaluation of the KiVa anti-bullying program. *Child Development, 81*,
- Li, Q. (2006). Cyberbullying in schools. A research of gender differences. *School Psychology International, 27*, 157-170.

- Li, Q. (2007). New bottle but old wine: A research of cyberbullying in schools. *Computers in Human Behavior*, 23, 1777-1791.
- Lienert, G. A. (1969). Die "Konfigurrenzfrequenzanalyse" als Klassifikationsmethode in der Klinischen Psychologie [Configural frequency analyses as classification method in clinical psychology]. In M. Irle (Ed.), *Bericht über den 26. Kongress der Deutschen Gesellschaft für Psychologie* [Report about the 26th congress of the German Society for Psychology]. Göttingen: Hogrefe.
- Menesini, E., & Nocentini, A. (2009). Cyberbullying definition and measurement: Some critical considerations. *Journal of Psychology*, 217, 230-232.
- Menesini, E., Nocentini, A., & Calussi, P. (in press). The measurement of cyberbullying: Dimensional structure and relative item severity and discrimination. *Cyberpsychology, Behavior, and Social Networking*.
- Monks, C. P., & Smith, P. K. (2006). Definitions of bullying: Age differences in understanding of the term, and the role of experience. *British Journal of Developmental Psychology*, 24, 801-821.
- Monks, C. P., Smith, P. K., Naylor, P., Barter, C., Ireland, J. L. & Cyne, I. (2009). Bullying in different contexts: Commonalities, differences and the role of theory. *Aggression and Violent Behavior*, 14, 146-156.
- Muthen, L. K., & Muthen, B. O. (2007). *Mplus User's Guide (5th ed.)*. Los Angeles, CA: Muthen & Muthen.
- Nocentini, A., Menesini, E., & Calussi, P. (2009, August). *Cyberbullying measurement: A comparison between different strategies*. Poster presented at the Postconference of the European Society for Developmental Psychology (ESDP) on Cyberbullying: Definition and Measurement Issues, Vilnius, Lithuania, August, 22nd-23rd.
- Olweus, D. (1991). Bully / victim problems among schoolchildren: Basic facts and effects of a school based intervention program. In D. J. Pepler & K. H. Rubin (Eds.), *The development and treatment of childhood aggression* (pp. 411-448). Hillsdale: Erlbaum.
- Olweus, D. (1996). *The Revised Olweus Bully/Victim Questionnaire*. Mimeo Bergen, Norway: Research Center for Health Promotion (HEMIL Center), University of Bergen.
- Ortega, R., Elípe, P., Mora-Merchán, J. A., Calmaestra, J., & Vega, E. (2009). The emotional impact on victims of traditional bullying and cyberbullying. A study of Spanish adolescents. *Zeitschrift für Psychologie / Journal of Psychology*, 217, 197-204.
- Pellegrini, A. D., & Bartini, M. (2000). An empirical comparison of methods of sampling aggression and victimization in school settings. *Journal of Educational Psychology*, 92, 360-366.
- Pornari, C., & Wood, J. (2010). Peer and cyber aggression in secondary school students: the role of moral disengagement, hostile attribution bias, and outcome expectancies. *Aggressive Behavior*, 36, 81-94.
- Raskauskas, J., & Stoltz, A. D. (2007). Involvement in traditional and electronic bullying among adolescents. *Developmental Psychology*, 43, 564-575.
- Roland, E. (1989). A system oriented strategy against bullying. In E. Roland & E. Munthe (Eds.), *Bullying: An international perspective* (143-151). London: David Fulton.
- Salin, D. (2001). Prevalence and forms of bullying among business professionals: A comparison of two different strategies for measuring bullying. *European Journal of Work and Organizational Psychology*, 10, 425-441.
- Slonje, R., & Smith, P. K. (2008). Cyberbullying: Another main type of bullying? *Scandinavian Journal of Psychology*, 49, 147-154.
- Smith, P. K., Cowie, H., Olafsson, R. F., & Liefhoghe, A. P. D. (2002). Definitions of bullying: A comparison of terms used, and age and gender differences, in a fourteen-country international comparison. *Child Development*, 73, 1119-1133.
- Smith, P. K., Mahdavi, J., Carvalho, M., Fisher, S., Russell, S., & Tippett, N. (2008). Cyberbullying: Its nature and impact in secondary school pupils. *Journal of Child Psychology and Psychiatry*, 49, 376-385.
- Smith, P. K., & Sharp, S. (1994). *School bullying: Insights and perspectives*. London: Routledge.
- Solberg, M. E., & Olweus, D. (2003). Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. *Aggressive Behavior*, 29, 239-268.
- Spiel, C., & Strohmeier, D. (under review). National strategy for violence prevention in the Austrian public school system: Development and implementation. *International Journal of Behavioral Development*.

Spiel, C., & von Eye, A. (2000). Application of Configural Frequency Analysis in educational research. *Psychologische Beiträge*, 42, 515-525.

Strohmeier, D., & Toda, Y. (2008). *Cross-national similarities and differences. The extent to which bullying and victimisation are similar, or show differences, across cultures, especially western and eastern cultures*. Paper presented at the preconference "Victimisation in Children and Youth" (organized by F. Alsaker & P. K. Smith) at the 20th Biennial Meeting of the International Society for the Study of Behavioural Development (ISSBD), Wurzburg, Germany, July 11-12.

Topçu, C., Erdur-Baker, O., & Çapa-Aydin, Y. (2008). Examination of cyberbullying experiences among Turkish students from different school types. *Cyberpsychology & Behavior*, 11, 643-648.

Twyman, K., Saylor, C., Taylor, L. A., & Comeaux, C. (2009). Comparing children and adolescents engaged in cyberbullying to matched peers. *Cyberpsychology, Behavior, and Social Networking*, 13(2), 195-199.

Välimäki, M. (2010, April). *Research methods and cyberbullying*. Paper presented at the COST training school "From research to policy and practice: innovation and sustainability in cyberbullying prevention" of the COST ACTION IS0801 ("Cyberbullying: Coping with negative and enhancing positive uses of new technologies, in relationships in educational settings") in Melbourne, Australia, April, 12-16.

Vaillancourt, T., McDougall, P., Hymel, S., Krygsman, A., Miller, J., Stiver, K., et al. (2008). Bullying: are researchers and children/youth talking about the same thing? *International Journal of Behavioral Development*, 32, 486-495.

Vandebosch, H., & van Cleemput, K. (2008). Defining Cyberbullying: A qualitative research into the perceptions of youngsters. *Cyberpsychology and Behavior*, 11, 499-503.

von Eye, A. (2002). *Configural Frequency Analysis - Methods, models, and applications*. Mahwah, NJ: Erlbaum.

von Eye, A., Mun, E. Y., & Bogat, G. A. (2008). Temporal patterns of variable relationships in person-oriented research: Longitudinal models of configural frequency analysis. *Developmental Psychology*, 44, 437-445.

Correspondence to:

Mag. Petra Gradinger
Faculty of Psychology, University of Vienna
Universitaetsstrasse 7
1010 Vienna, Austria
TEL: +43 1 4277 47375, FAX: +43 1 4277 47879,
Email: petra.gradinger@univie.ac.at

About author(s)



Petra Gradinger studied Psychology at the University of Vienna, Austria, and began to work within research projects in the topic of Educational Psychology. After receiving her master degree in 2005, she started her PhD (finished 2010). In 2006 she became a faculty member of the Faculty of Psychology at the University of Vienna, Austria. Her PhD project on the topic of cyberbullying is part of the research program on bullying and bullying prevention carried out by the principal investigators Christiane Spiel and Dagmar Strohmeier. Petra has been familiar with bullying research and bullying prevention since many years, as she gave presentations at conferences and held seminars for teachers and youth workers on the topic of bullying prevention. In addition she is familiar with fostering motivation and performance through e-learning methods in higher education.



Dagmar Strohmeier received her Master's degree in Psychology in 2001 at the University of Graz, Austria and her PhD in Psychology in 2006 at the University of Vienna, Austria. Dr. Strohmeier currently holds a position as an assistant professor at the Faculty of Psychology, University of Vienna. Dr. Strohmeier's main research interests are peer relations in schools.



Christiane Spiel is Professor of Educational Psychology and Evaluation and department head at the Faculty of Psychology, University of Vienna. Actually, she is president of the Austrian Society for Psychology, president of the DeGEval – Gesellschaft fuer Evaluation (Evaluation Society in Germany and Austria), member of the boards of directors of the

Leibniz-University of Hannover and the Bergische University of Wuppertal. She is and has been chair and member of various international advisory and editorial boards as e.g., chair of the ERIH expert panel of the European Science Foundation for psychology, president of the European Society for Developmental Psychology, and founding dean of the Faculty of Psychology at the University of Vienna. In several projects she is working together with the Austrian Federal Ministry for Education and the Austrian Federal Ministry for Science and Research. She has got several awards for research, university teaching, and university management and has published more than 190 original papers. She has added many external funded projects and organized several international conferences. Her research topics are on the boarder between developmental psychology, educational psychology and evaluation. Specific research topics are: Bullying und victimization, integration in multicultural school classes, lifelong learning, change measurement, evaluation research and quality management in the educational system.

Copyright of Cyberpsychology is the property of Masarykova Univerzita, Fakulta Socialnich Studii and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.